

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RD-ATC-33	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/GB2004/002589	International filing date (day/month/year) 17/06/2004	(Earliest) Priority Date (day/month/year) 17/06/2003
Applicant ADVANCED TECHNOLOGIES (CAMBRIDGE) LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1 Basis of the report

a With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b ☒ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box II).

3. ☐ Unity of invention is lacking (see Box III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regards to the **drawings**,

a. the figure of the drawings to be published with the abstract is Figure No. 5

☐ as suggested by the applicant.

☒ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

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International application No.

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Box No. 1 Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:
 - a. type of material
 - ☒ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material
 - ☒ in written format
 - ☒ in computer readable form
 - c. time of filing/furnishing
 - ☒ contained in the international application as filed
 - ☒ filed together with the international application in computer readable form
 - ☐ furnished subsequently to this Authority for the purpose of search
2. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB2004/002589

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N15/82 A01H5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N A01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, Sequence Search, WPI Data, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ERKKILA M J ET AL: "Allele-dependent barley grain beta-amylase activity" PLANT PHYSIOLOGY, AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, ROCKVILLE, MD, US, vol. 117, no. 2, 1998, pages 679-685, XP002961797 ISSN: 0032-0889 figure 2	16, 17
X	-& DATABASE EMBL 23 October 1998 (1998-10-23), ERKKILA M.J. ET AL: XP002295276 retrieved from EBI Database accession no. AF061203 nts: 426-547 ----- -/--	16, 17

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

7 September 2004

Date of mailing of the international search report

22/09/2004

Name and mailing address of the ISA

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NL - 2280 HV Rijswijk
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Authorized officer

Blanco Urgoiti, B

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB2004/002589

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 677 474 A (ROGERS JOHN C) 14 October 1997 (1997-10-14) column 4, line 49 - column 5, line 25 column 13, line 28 - line 31; example 3 -----	1-17
Y	LAZARO A ET AL: "SIGNAL PEPTIDE HOMOLOGY BETWEEN THE SWEET PROTEIN THAUMATIN II AND UNRELATED CEREAL ALPHA AMYLASE-TRYPSIN INHIBITORS" FEBS LETTERS, vol. 239, no. 1, 1988, pages 147-150, XP002295200 ISSN: 0014-5793 figure 1 -----	1-17
Y	-& DATABASE UNIPROT 1 August 1990 (1990-08-01), LAZARO A. ET AL.: XP002295277 retrieved from EBI Database accession no. P16969 "Comments" -----	1-17
A	WHITTIER R F ET AL: "STRUCTURE OF THE GENE FOR THE BARLEY THIOL PROTEASE ALEURAIN" PLANT PHYSIOLOGY (ROCKVILLE), vol. 83, no. 4 SUPPL, 1987, page 26, XP002295201 & ANNUAL MEETING OF THE AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, ST. LOUIS, MISSOURI, USA, JULY 19-23, ISSN: 0032-0889 -----	
A	WO 98/08961 A (DOAN DANNY N P ; OLSEN ODD ARNE (NO); LINNESTAD CASPER (NO)) 5 March 1998 (1998-03-05) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB2004/002589

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5677474	A	14-10-1997	AU 638409 B2	01-07-1993
			AU 4037289 A	05-03-1990
			EP 0428572 A1	29-05-1991
			JP 4500153 T	16-01-1992
			WO 9001551 A1	22-02-1990
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WO 9808961	A	05-03-1998	AU 3781897 A	19-03-1998
			WO 9808961 A2	05-03-1998
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/GB2004/002589

International filing date (day/month/year)
17.06.2004

Priority date (day/month/year)
17.06.2003

International Patent Classification (IPC) or both national classification and IPC
C12N15/82, A01H5/00

Applicant

ADVANCED TECHNOLOGIES (CAMBRIDGE) LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITYInternational application No.
PCT/GB2004/002589

IAP20 RECEIVED TO 16 DEC 2005

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☒ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☒ in written format
☒ in computer readable form
 - c. time of filing/furnishing:
☒ contained in the international application as filed.
☒ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/002589

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-15
	No: Claims	16,17
Inventive step (IS)	Yes: Claims	
	No: Claims	1-17
Industrial applicability (IA)	Yes: Claims	1-17
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2004/002589

IAP20 Rec'd PCT-PTO 16 DEC 2005

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

- D1: ERKKILA M J ET AL: "Allele-dependent barley grain beta-amylase activity" PLANT PHYSIOLOGY, AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, ROCKVILLE, MD, US, vol. 117, no. 2, 1998, pages 679-685.
- D2: US-A-5 677 474 (ROGERS JOHN C) 14 October 1997
- D3: LAZARO A ET AL: "SIGNAL PEPTIDE HOMOLOGY BETWEEN THE SWEET PROTEIN THAUMATIN II AND UNRELATED CEREAL ALPHA AMYLASE-TRYPSIN INHIBITORS" FEBS LETTERS, vol. 239, no. 1, 1988, pages 147-150,

2. NOVELTY (Art. 33(2) PCT)

- 2.1 The document D1 discloses the genomic sequence (database entry) and organization (see Fig. 2) of an endosperm enzyme from barley. It's 73% identical from nucleotides 426 to 547 to nucleotides 51 to 171 of SEQ ID NO:1 of the present application.
- 2.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 16 c) is not new in the sense of Article 33(2) PCT. The same holds for claim 17 as dependent on 16.

3. INVENTIVE STEP (Art. 33(3) PCT)

- 3.1 Document D2 is regarded as being the closest prior art and discloses constructs for driving an endosperm specific expression. The promoter from barley aleurain is used to drive the expression of a marker gene in transgenic barleys (see example 3). Methods for cloning the promoter regions of known endosperm specific genes are detailed (see column 4, line 49 to column 5, line 25).
- 3.2 The present application therefore differs from D2 in that a different endosperm

specific promoter from barley is disclosed herein.

- 3.3 The problem to be solved by the present invention may therefore be regarded as the provision of a further endosperm specific promoter from barley. The solution proposed is the provision of the limit dextrinase inhibitor promoter of SEQ ID NO:1. This solution cannot be considered as involving an inventive step because D3 discloses the cDNA coding for the limit dextrinase inhibitor from barley. The person skilled in the art would have found obvious when trying to clone a further endosperm specific promoter to use the cDNA of D3 and follow the teachings of D2 on how to find the corresponding promoter. Moreover, the sole reason of having a new sequence of deoxyribonucleotides, can not be regarded as inventive. Inventive step could be acknowledge if the specific succession of deoxyribonucleotides imparted some unexpected properties to the molecule which has not been shown here.
- 3.4 In consequence, the subject-matter of claims 1 to 17 is not inventive in the sense of Article 33(3) PCT
4. REMARK
- 4.1 Claim 17 saying "A DNA sequence according to claim 14 " has been read as "A DNA sequence according to claim 16" to carry out both the search and the examination.